Spring 2012
Volume 2, Issue 3

TECHNICALLY SPEAKING

"Tech Support, Dean Gray."

If you have called our technical assistance line for help with commercial and industrial products, you might have heard the phone answered with that greeting. After Friday, March 30th, you will no longer have that option.

Dean Gray is happily retiring after a total 12 year term in our Technical Service department. His professional career covered a range of positions including working with industrial controls, laboratory work with scientific and medical research, and as a field engineer with Packard Instruments.

We certainly wish Dean the best and will miss his in-depth knowledge of Lochinvar products. If you didn't get the opportunity to wish Dean happy trails, he left a contact number: **1-800-GONE FISHING**.

New People News

It stands to reason with losing Dean, we have to gain some guys to make up the slack. You might say we have had to triple our effort!

JONATHAN BAGGETT:

Jon is a 2008 graduate of Middle Tennessee State University. There he studied Aerospace Maintenance Management and Electrical Engineering Technologies. He completed school with a degree and an Airframe and Powerplant (A & P) mechanics license. He was shooting for the top with a head full of ideas and a heart full of dreams, but was taken aback by the harsh reality of a bad economy.

After working for a few years as a Motorcycle technician, Jonathan joined our Lochinvar family as a Technical Service Technician. We are sure his skill set will be a big asset to our company and give him a very warm welcome!

JASON DEAKINS:

Jason is actually not a new person to Lochinvar, but is new to our Technical Service Department. Jason worked for 5 years in our Engineering lab on various projects and products. His experience prior to joining our Lochinvar family includes plumbing and HVAC work.

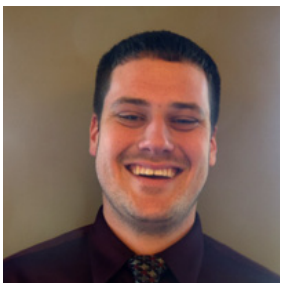
Jason is married with two children and enjoys watching football, fishing and he collects sports cards.

MICHAEL HEVERLY:

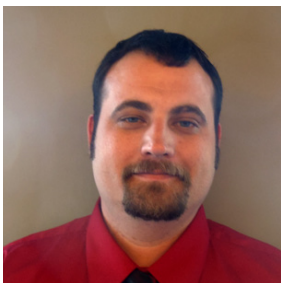
Like Jason, Mike is also a Lochinvar alumni. He has joined the Technical Service team after spending 1 year as a Customer Service Representative for the northeast region.

His previous professional experience includes being a purchasing agent for Loews Hotels and serving as housekeeping manager for The Chattanoogan Hotel.

Mike is married and has two sons, ages 8 &10. The Heverly family also includes a cat, a Boxer, and a Bulldog.



Jon Baggett



Jason Deakins

Mike Heverly

For Information On:

- Product Manuals
- Training Schedules
- Wiring Diagrams
- Archived Models

Visit our website:
Lochinvar.com

TOLL FREE TECHNICAL HELP
1-800-722-2101
MONDAY-FRIDAY:
7:30 a.m. – 5:00 p.m.

AFTER HOURS
MONDAY-FRIDAY:
5:00 p.m. – 8:00 p.m.

SATURDAY-SUNDAY:
8:00 a.m. – 4:00 p.m.
CENTRAL STANDARD TIME

FAX: (615) 882-2963

Reimbursement Requests, Start Ups, etc:
2tech@lochinvar.com

Online Training Questions:
skillbuilder@lochinvar.com

SERVICE TECHNICIANS
Mike Davenport
Jon Baggett
Jason Deakins
Joey Foster
Mike Heverly
Mike Krueger
Dan Rettig
Harold Rice
Greg Russell
Paul Vallett

John Sinclair
Assistant Service Manager

Cindy Laskey
Product Services Secretary

Diane Morris
Service Clerk

Considering The Entire System

Our sales and marketing department has added a new position to enhance heating system designs which incorporate Lochinvar products. Paul Rohrs is filling this new position but is not new to Lochinvar. He is very knowledgeable about many issues in the field and with our products, having spent some years as an installer, twelve years as a hydronic system designer and most recently as a product manager.

Paul Rohrs
Design & Application Specialist

This position will include a focus on Renewable Energies and an emphasis on "System" based designs with Lochinvar equipment. In addition, Paul will be introducing an online training program as well as a tiered training program with basic, intermediate, and advanced levels. Paul will also be available for systems based questions pertaining to system piping that relates to Lochinvar equipment in a system.

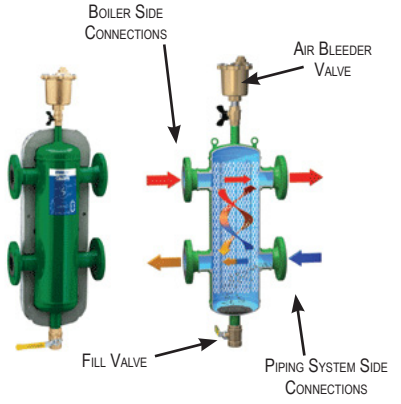
For assistance with solar design requests and solar quotes, send an email request to solar@lochinvar.com. Other technical support should be routed through our technical service department by calling 1-800-722-2101.

Pipe It In With Ease!

By Joey Foster

Using hydraulic separators is becoming more and more prevalent in our industry. With the recent push to utilize green technology, and with efficiency incentives offered by the federal government; old, high volume boilers are being replaced with high efficiency, low volume boilers.

Replacing equipment can be labor and time intensive. One way to save time and make replacement easier, is to use a hydraulic separator in the piping system. These practical components prevent flow in one circuit from interfering with flow from another circuit. This easily accomplishes a primary/secondary piping arrangement. There is no need to measure and cut extra copper to make a hydraulic separation. This saves the time and material costs it takes to design and build proper primary/secondary connections. By using a hydraulic separator, installation of new, high efficiency boilers into existing applications will be faster and easier.



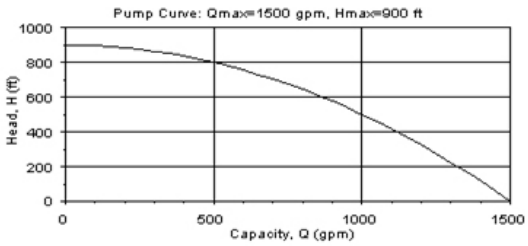
A hydraulic separator and cut-away view of water flow-through

Calculating And Using A Pump Curve

By Greg Russell

When sizing the pump for a new system, graphs like the one below can help show pump characteristics. This is a very simple pump curve for a pump with a single impeller, one motor size, and a consistent efficiency. By studying the graph, some of the data used for plotting a pump curve is evident:

- Head (H)
- Capacity (Q)
- Max. Capacity (Q_{max})
- Max. Head (H_{max})



In this graph, when Q = 0, H = H_{max}. The same is also true when H = 0, Q = Q_{max}.

EXAMPLE:

To save time, some established values will be used:

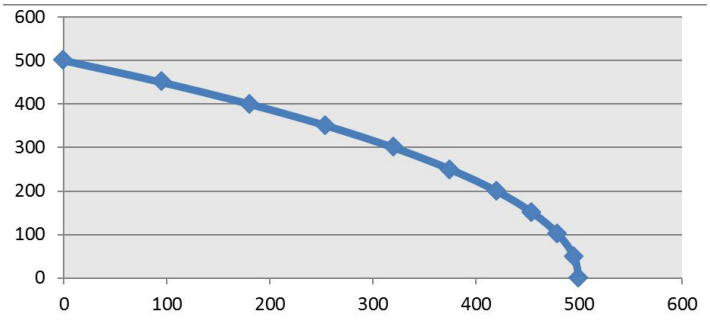
Qmax = 500 gpm
Hmax = 500 ft.

With these two values, use different values for Q to equate the value of H the plot the graph. Here is the formula to use:

(Don't be intimidated, it is actually very simple!)

$$H = H_{max} (1- (Q/Q_{max})^2)$$

Armed with this formula and maybe a little help from Excel, the graph will take shape:



Reference: http://www.lmnoeng.com/Pipes/HWpump.htm

USING THE CURVE

Proper pump sizing is a critical step in designing hydronic system(s). GPM, Feet of Head, Delta T, and BTUH are all components of sizing a circulator for a new system. What if there is already a circulator

Calculating And Using A Pump Curve *(Continued)*

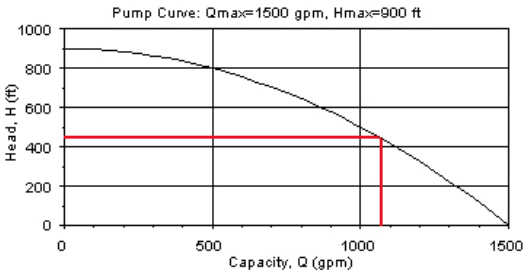
and the flow needs to be checked to make sure it is adequate? The following technique will help in this case:

1. Using a pressure gauge, measure the pressure before the pump (P_{in}), then measure pressure after the pump (P_{out}).
   - P_{out} - P_{in} = Pressure Difference (**ΔP**)
   - **ΔP** x 2.31 = Head Loss (**H**)
2. After performing above calculation, use pump curve from the manufacturer and mark the head loss on the left hand side of the chart. Then draw a horizontal line from that point until it intersects the pump curve.
   - The value indicated on the curve will be Q, or GPM, of this particular pump.
3. Verify Q, coupled with the system curve, is the best flow rate for the system.

EXAMPLE:

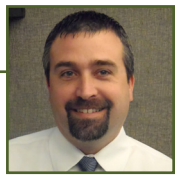
Gauge readings identify P_{in} = 50 and P_{out} = 250.

Using previously shown equations, **ΔP** = 200 and Head Loss (**H**) = 462 ft.



Locate H = 462 ft. on the left hand side of the given pump curve, then mark a line over and down to Q ≈ 1050 gpm. Compare this value to the system curve to check for proper flow from the pump. Incorporate the use of circuit setters and ball valves in the system to further regulate the flow.

Is It Really Hot, Or Not?



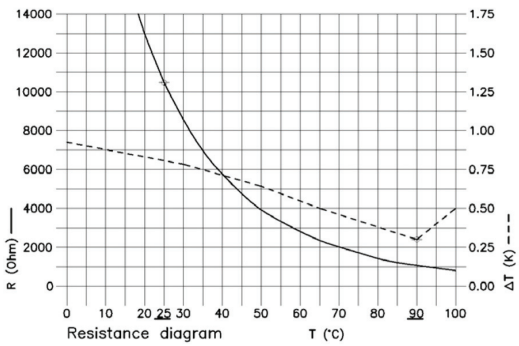
By Mike Davenport

Lochinvar products utilize temperature sensors to sense water temperatures in various areas of the heating system:

- at the heater
- in the system heating loop
- at the water storage tank
- to detect outdoor air temperature
- to monitor flue temperatures

The temperature sensors, called **thermistors** (from the combination of the words **ther**mal and res**istor**), vary the resistance through a circuit based on the temperature reading at that sensor. This resistance is read by an electronic thermostat or integrated control board to allow safe and proper operation of the heater.

Lochinvar utilizes mainly NTC Thermistors for sensing temperatures. NTC is an abbreviation of **N**egative **T**emperature **C**oefficient which means as temperature increases on the sensor, resistance in the circuit decreases. NTC thermistors are made from compressed semiconductor material like a sintered metal oxide. Semiconductors have the nature to increase the number of electrons available to carry a charge as the temperature increases on the semiconductor material. This increase in available electrons effectively reduces the resistance through the thermistor.



Temp sensor curve for a common Lochinvar TST2032

This behavior of the semiconductor material in the sensor is not a linear exchange of electrons. This creates a specific resistance curve for that particular sensor.

The TST2032 is a simple 2-wire sensor used in various units such as the original Knight and Armor units, Solution, Copper-Fin and Power-Fin units. This sensor reads 10K Ohms at 77 degrees Fahrenheit.

An ohm is the standard unit for measuring resistance in a circuit. When measuring resistance, **be sure** to always power off the heater then disconnect the sensor from the harness or control board to get an accurate resistance reading through the sensor. Comparing actual water temperature to the resistance reading is how to verify the sensor is working correctly. Unit manuals contain sensor temp versus resistance charts for easy reference. The chart shown is for the TST2032 found in the Power-Fin Service Manual on page 33:

Inlet/Outlet System/Tank Sensor

Resistance Vs. Temperature

Temperature	Resistance	Temperature	Resistance
50	18,780	158	1,990
68	12,263	176	1,458
86	8,194	194	1,084
104	5,592	212	817
122	3,893		
140	2,760		

With the advancement of modern controls, it is also possible to read multiple temperatures with one sensor. Our new Crest and second generation Knight and Armor models use a dual thermistor to compare temperatures in the unit outlet and in the flue. The use

Is It Really Hot, Or Not?
(Continued)

of dual sensors can increase unit safety and control without adding more expensive devices.

Troubleshooting temperature sensors is often required to determine if a sensor has changed resistance value outside of its normal curve or if the sensor has failed. The Smart System Control on many Lochinvar products will do some of the troubleshooting by displaying various codes for sensor faults. To determine the specific sensor, measure actual water temperature then compare it to the displayed temperature. Other units that do not display temperatures will require actually measuring the resistance with a meter to make this comparison.

We didn't feature a QR code in our last edition of Technically Speaking, so it's time for another so we stay up with the trend. Check it out, you might learn something new! We welcome any feedback by email at 2tech@lochinvar.com.

Online Training UPDATE!

Thanks to the diligence of Cindy Laskey and our IT dept, we now have the training designations on our Authorized Service Provider listings. These website listings show completed training for various product categories. We are still planning more enhancements for online training, so be on the lookout for more announcements to stay up to date with our progress.

Clean, Check, Lubricate, Then Jump In!

By Harold Rice

With spring in full swing and summer soon to follow, that must mean it's pool season!!!! It is vital to ensure pool equipment is properly maintained so actually swimming in the pool is relaxing and great fun. Whether at a hotel, fitness facility, amusement park, or in the backyard, there is responsibility of safety and maintenance.

For a qualified service contractor, it is very important to carefully read the Installation and Service Manual. This is important because failure to perform the proper service and maintenance could result in equipment failure, property damage, personal injury, or death.

Things that must be checked and serviced before pool heater is put into operation:

1. **Venting:**

   (Indoor Installation) – Examine the vent system to make sure there are no signs of leaks, corrosion, or deterioration.

   (Outdoor Installation) – Ensure no trees, shrubs, or other plants obstruct the outdoor vent system.

2. Make sure that the pool heater has **adequate ventilation air and flow of combustion**:

   Beware of chemicals or flammable materials that may be present in the room or close to the vent-air intake system.

3. **Flush the burners with water** to remove sediment.
4. **Brush the coils of the heat exchanger** to remove scale.
5. **Clean the combustion fan.**
6. **Use only the specified gas type** as indicated on the rating plate.
7. **Verify air pressure settings** are to unit specification.
8. **Lubricate circulator pump** according to manufacturer's recommendations.
9. **Check** to be sure **all electrical connections** are secure, well insulated and properly grounded.

Reasons Preventative Maintenance is Key

EQUIPMENT OWNERS

Keep units operating at maximum efficiency for lower utility cost

Get longest possible equipment life

Help prevent unscheduled, costly service calls

Provide confidence that unit is running safely and dependably

SERVICE CONTRACTORS

Opportunity to establish and build strong relationship with customers by:

- Ensuring longevity of unit(s)
- Recognizing opportunities for future sales
- Making service calls take less time to complete

Expand business by:

- Having continuous income stream especially during less busy times
- Being available for additional jobs

Avoid unnecessary emergency situations